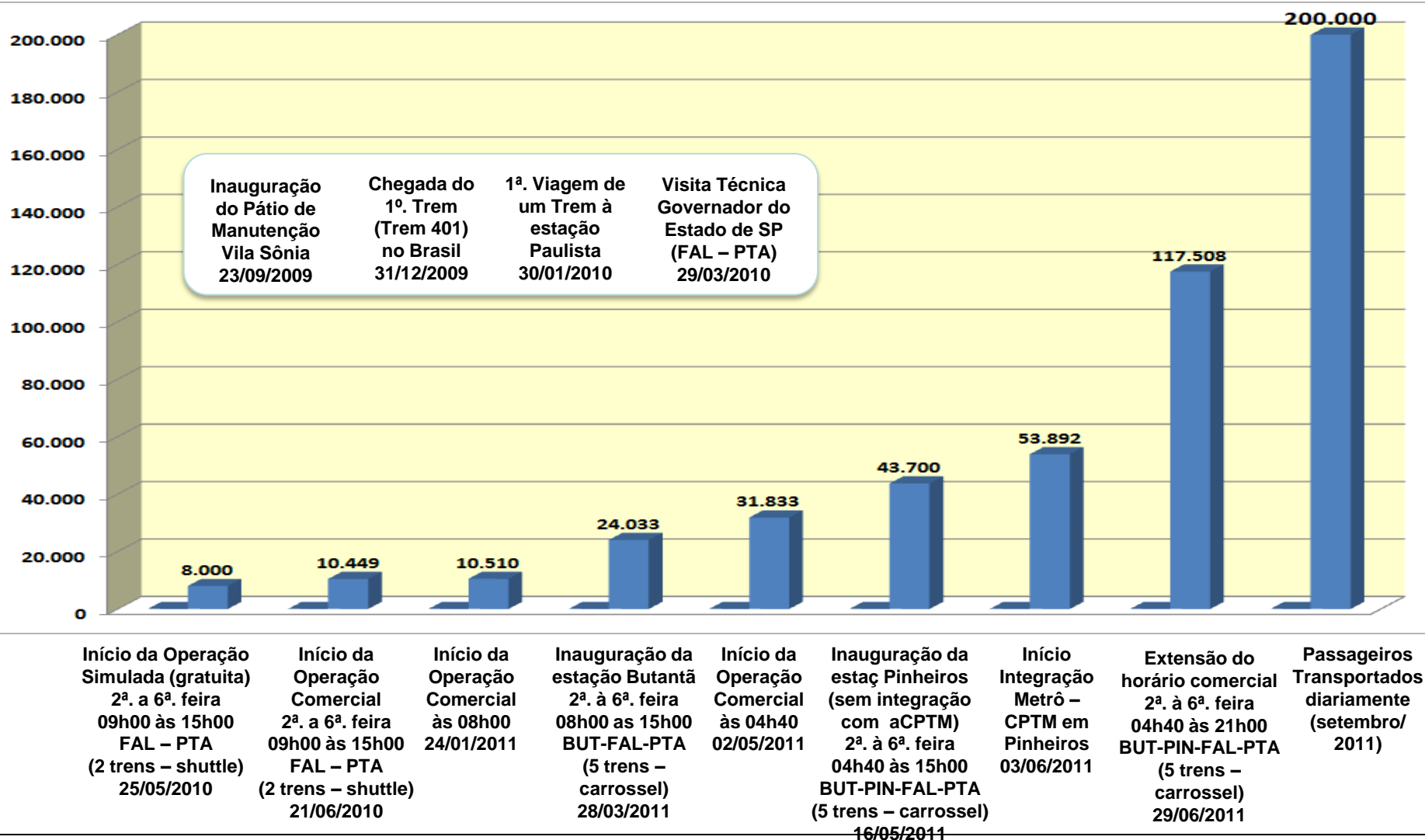




ViaQuatro – Sistema de Sinalização da Linha 4  
(CBTC / UTO) – Valeu a pena?

Jorge Martins Secall, PhD, AMIRSE  
Diretor



Inauguração do Pátio de Manutenção Vila Sônia 23/09/2009

Chegada do 1º. Trem (Trem 401) no Brasil 31/12/2009

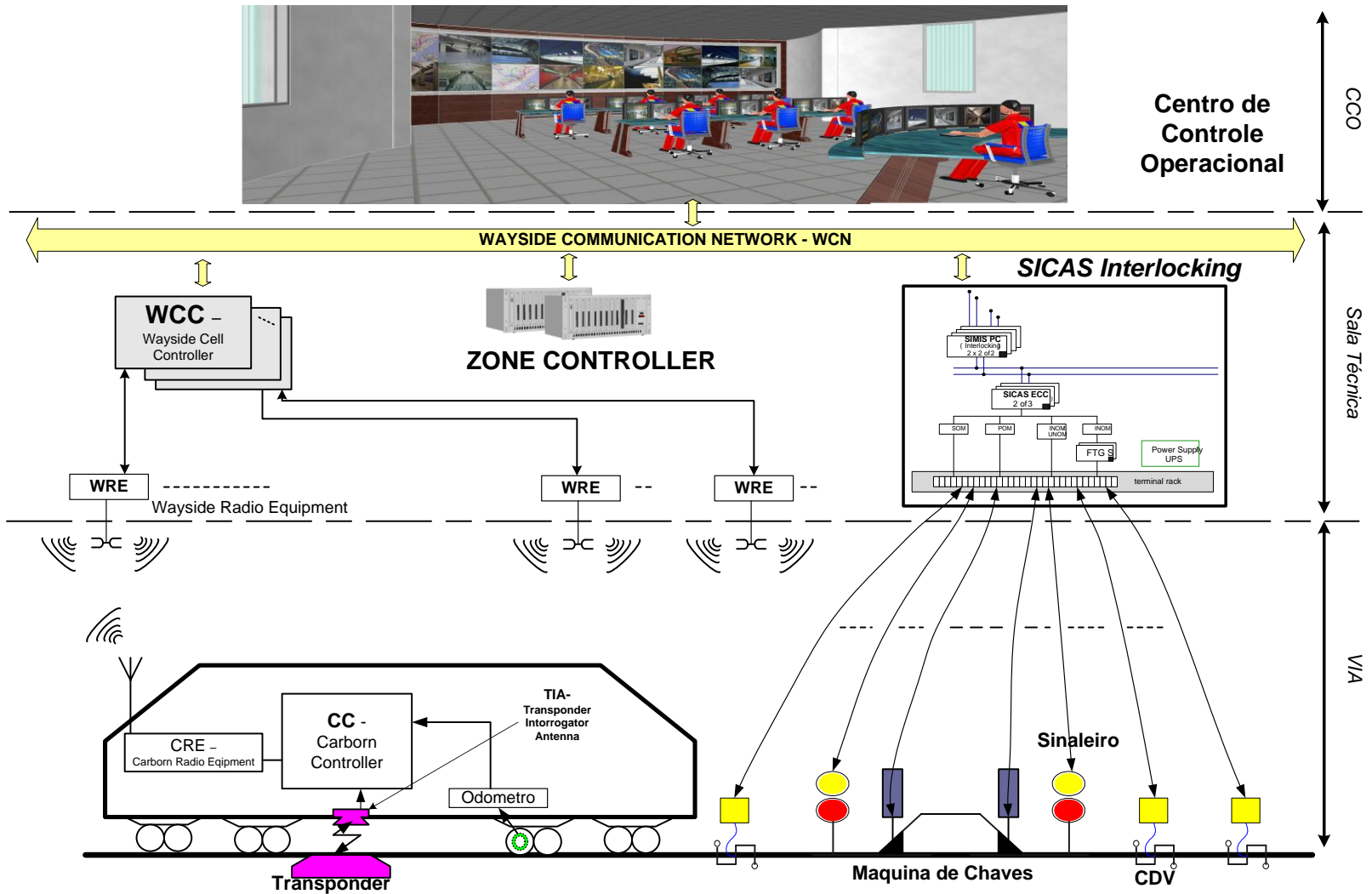
1ª. Viagem de um Trem à estação Paulista 30/01/2010

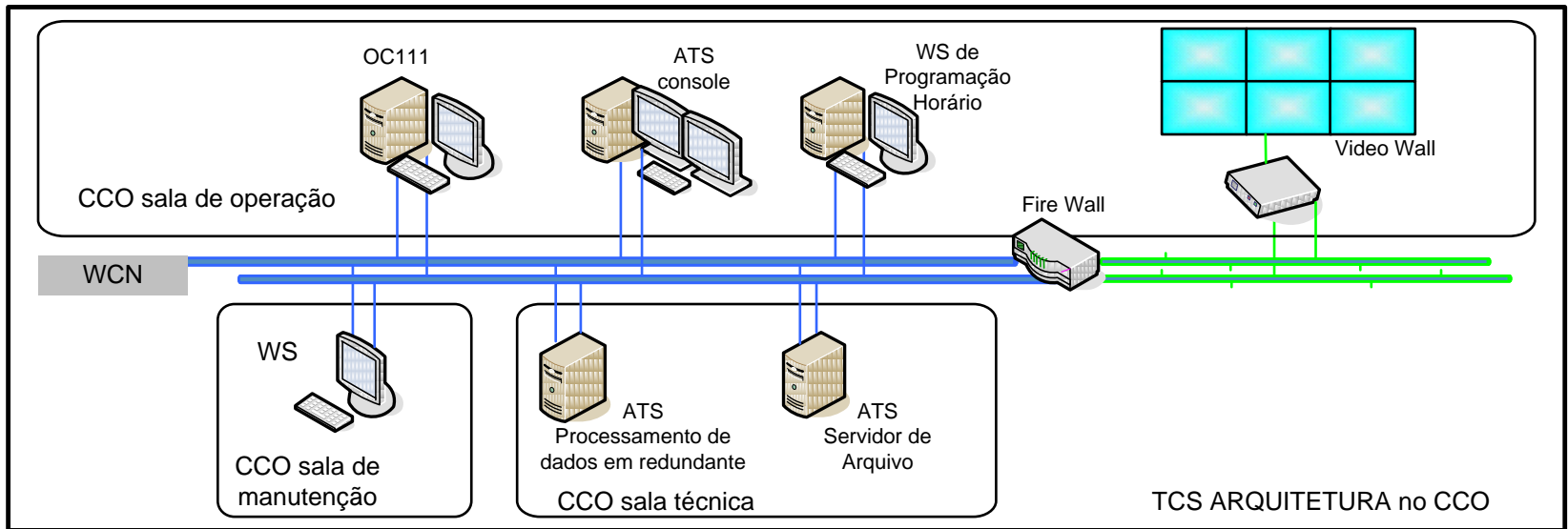
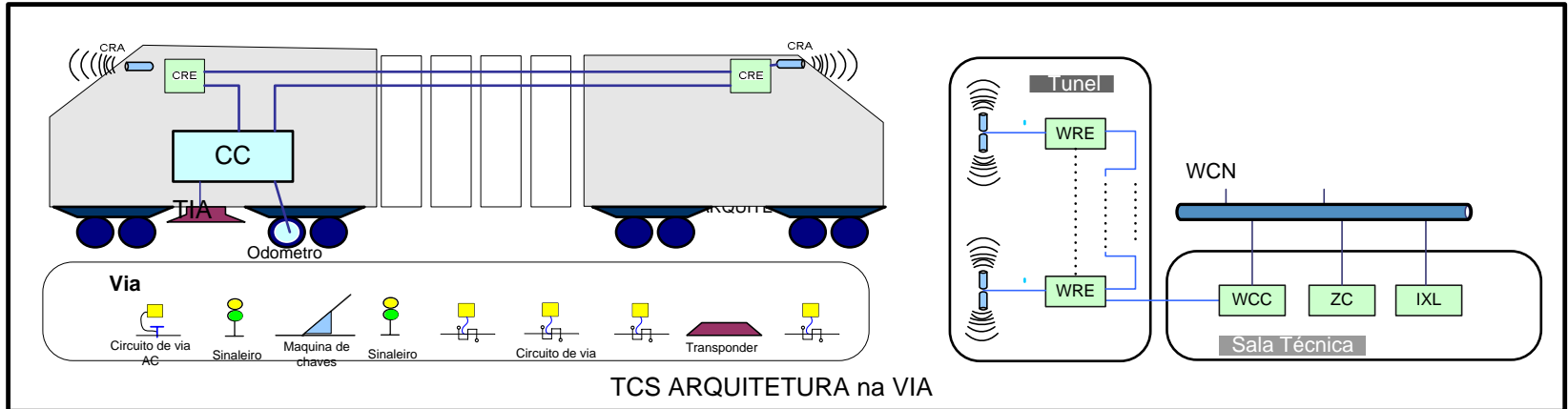
Visita Técnica Governador do Estado de SP (FAL – PTA) 29/03/2010

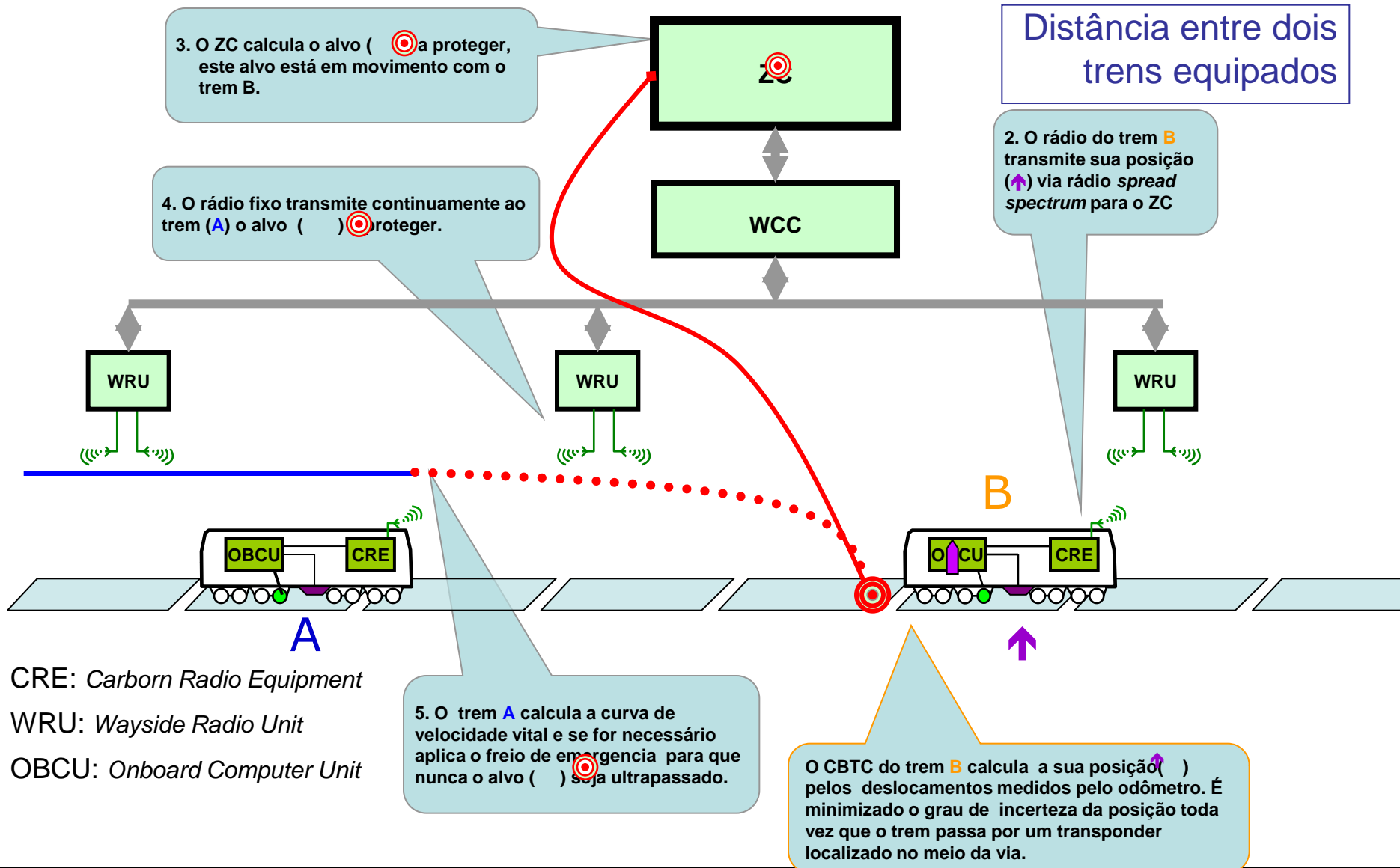
# A concepção do sistema

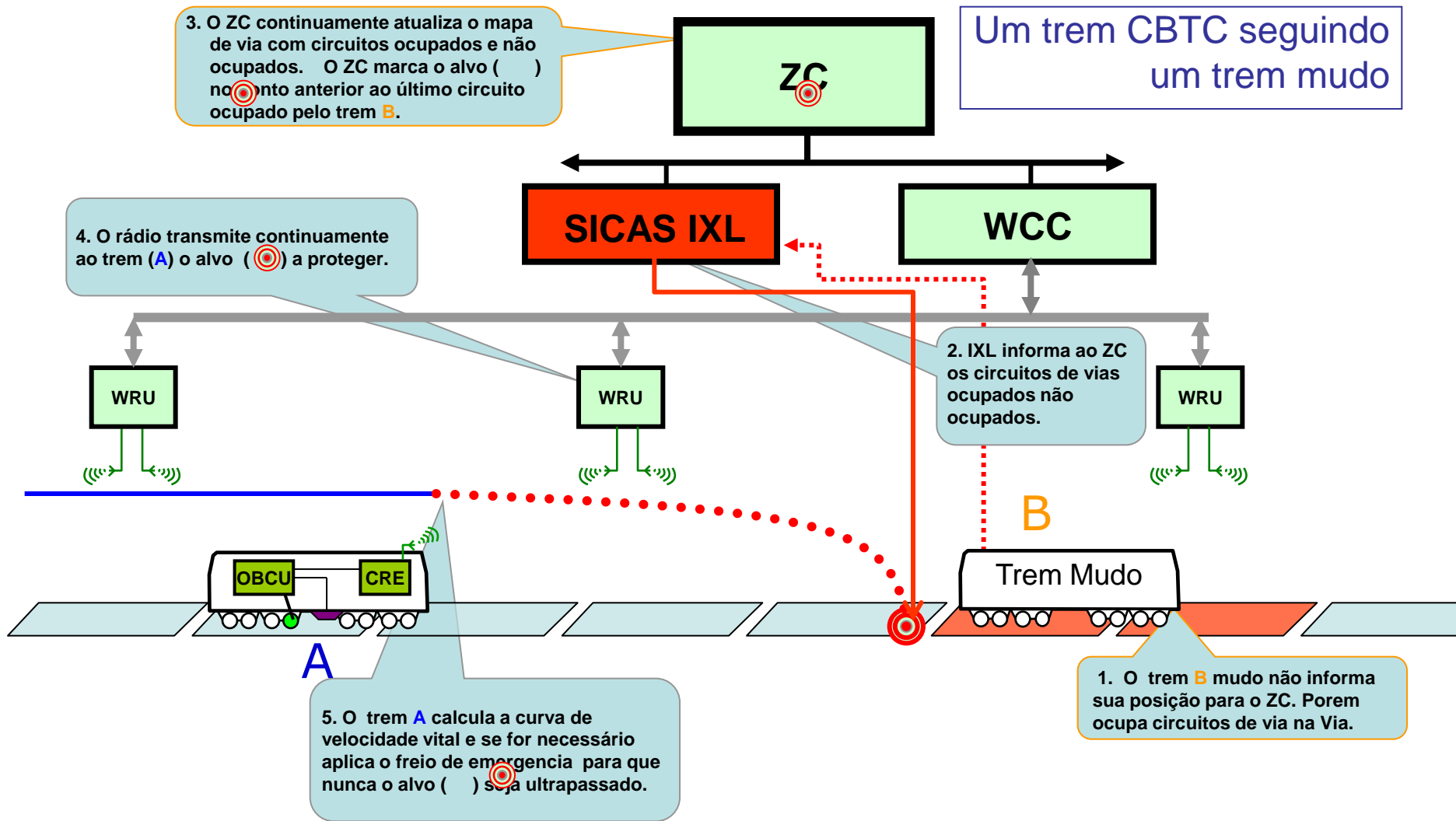


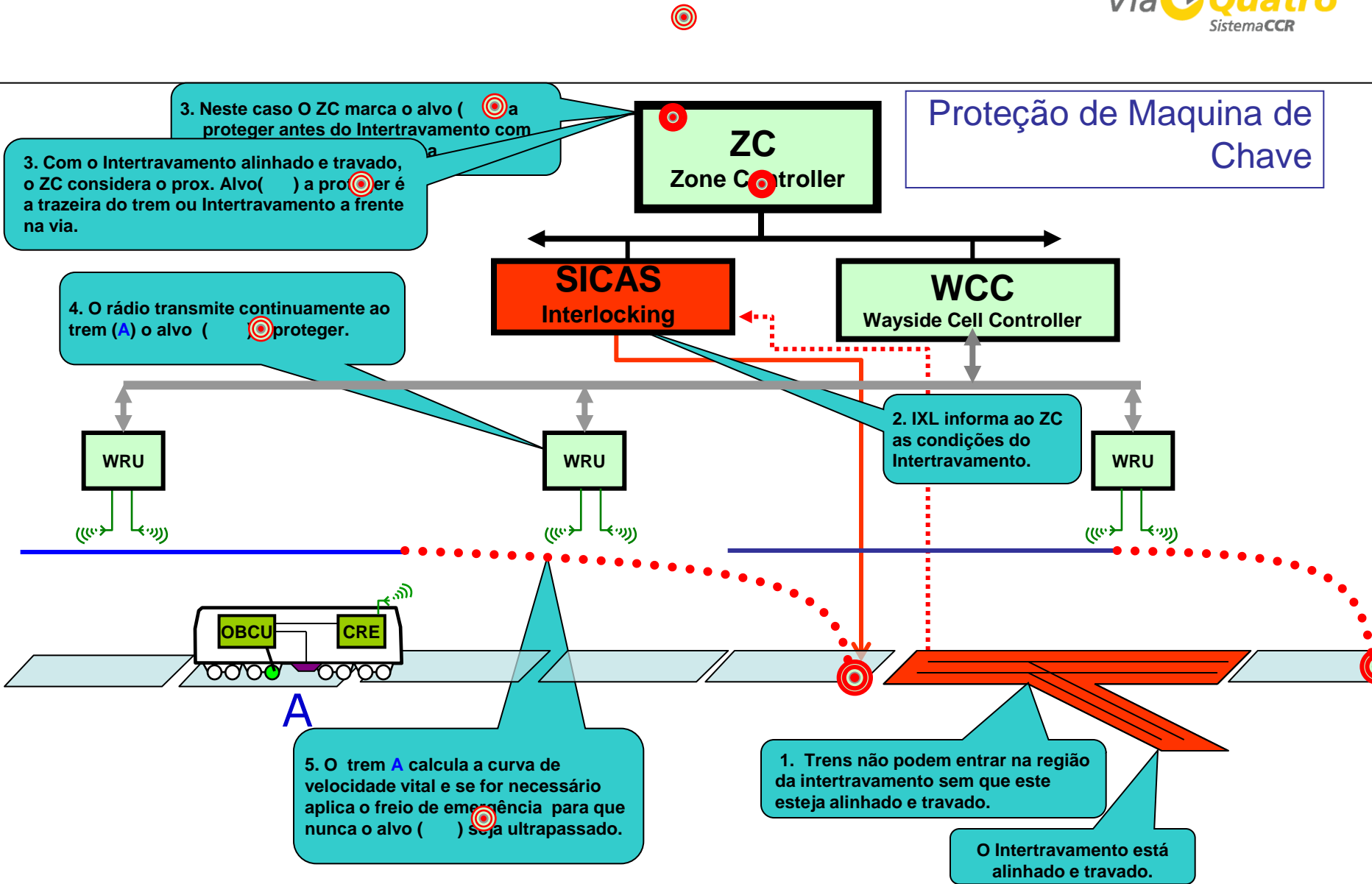
# CBTC





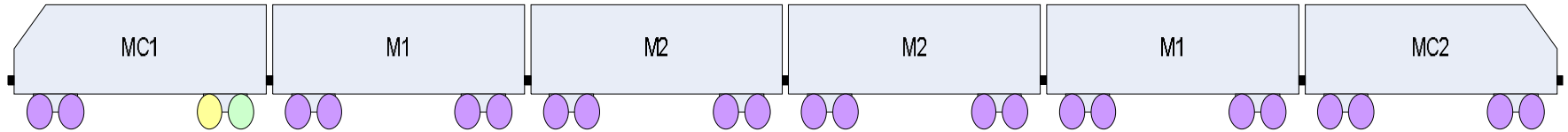











# ODÔMETRO



-  Eixo motorizado e com Freio
-  Eixo sem Freio
-  Eixo com Freio



# Transponder e TIA



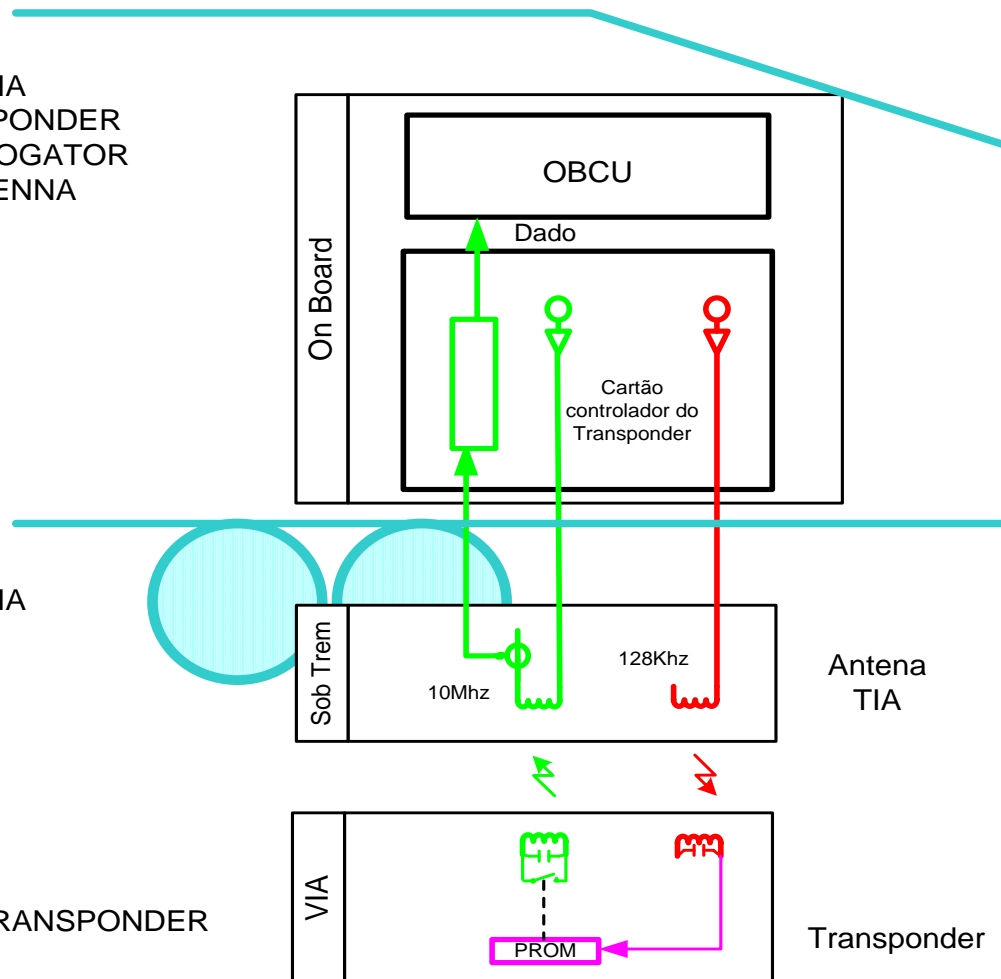
TIA  
TRANSPONDER  
INTORROGATOR  
ANTENNA



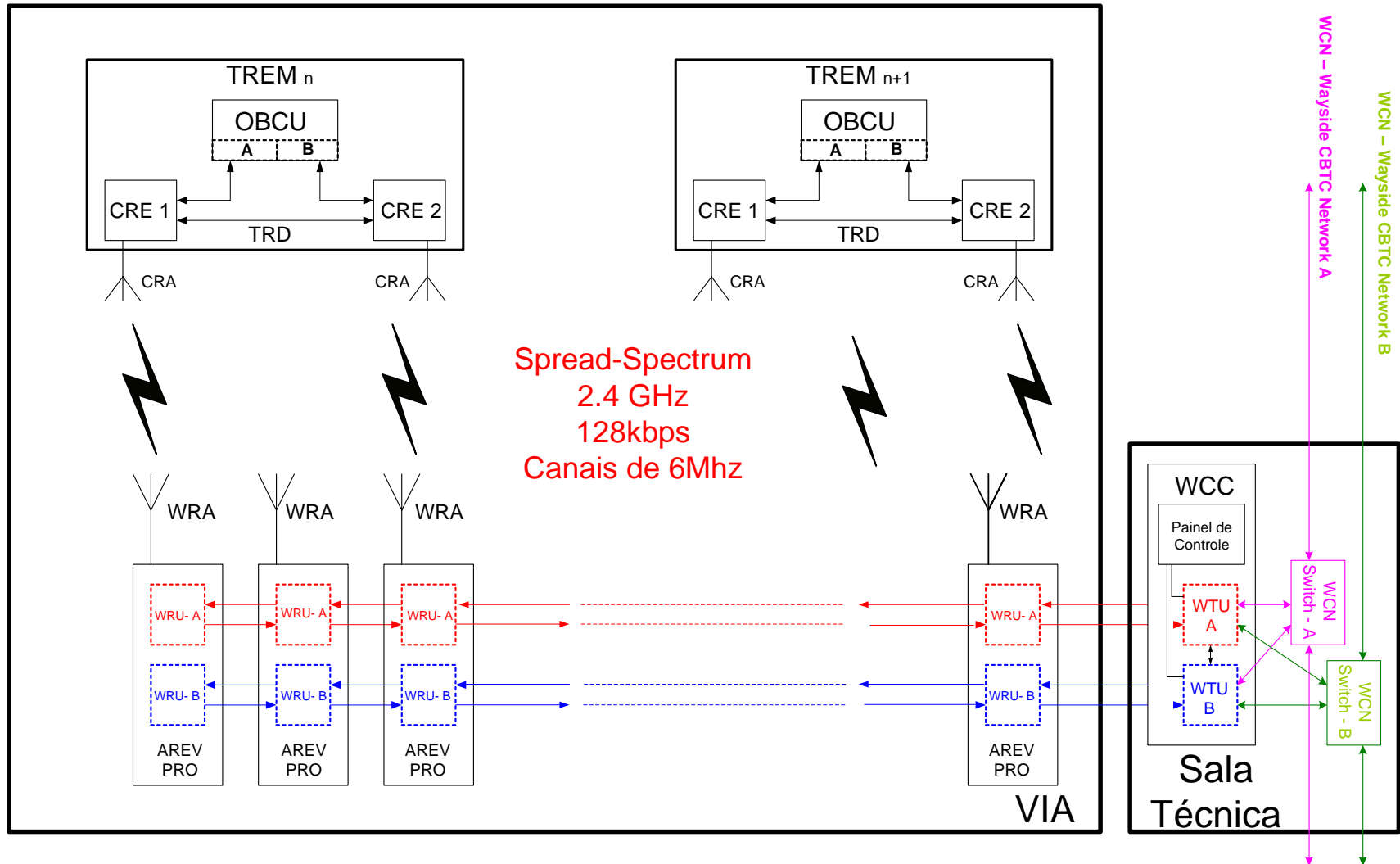
TIA



TRANSPONDER

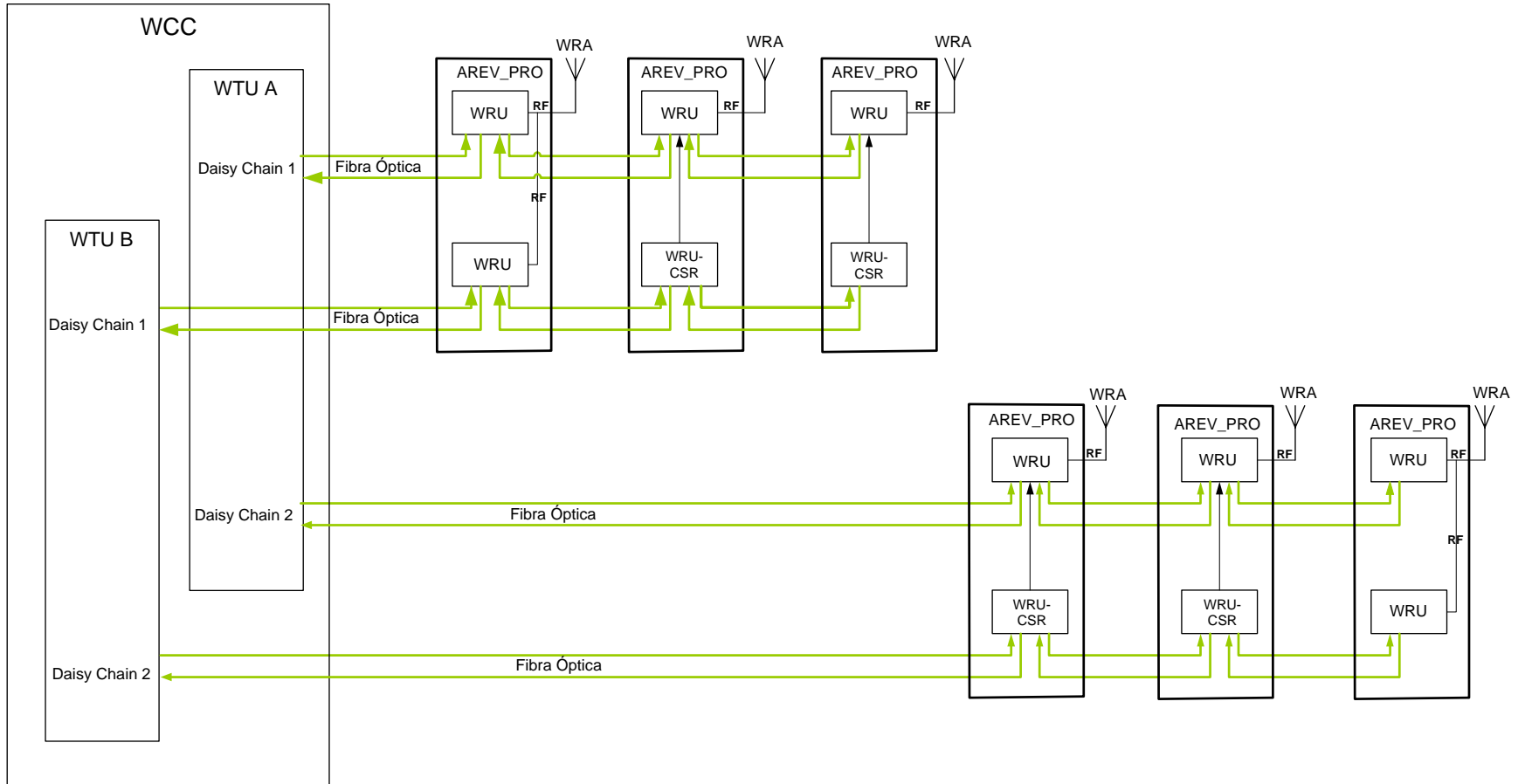


# AIRLINK comunicação CBTC



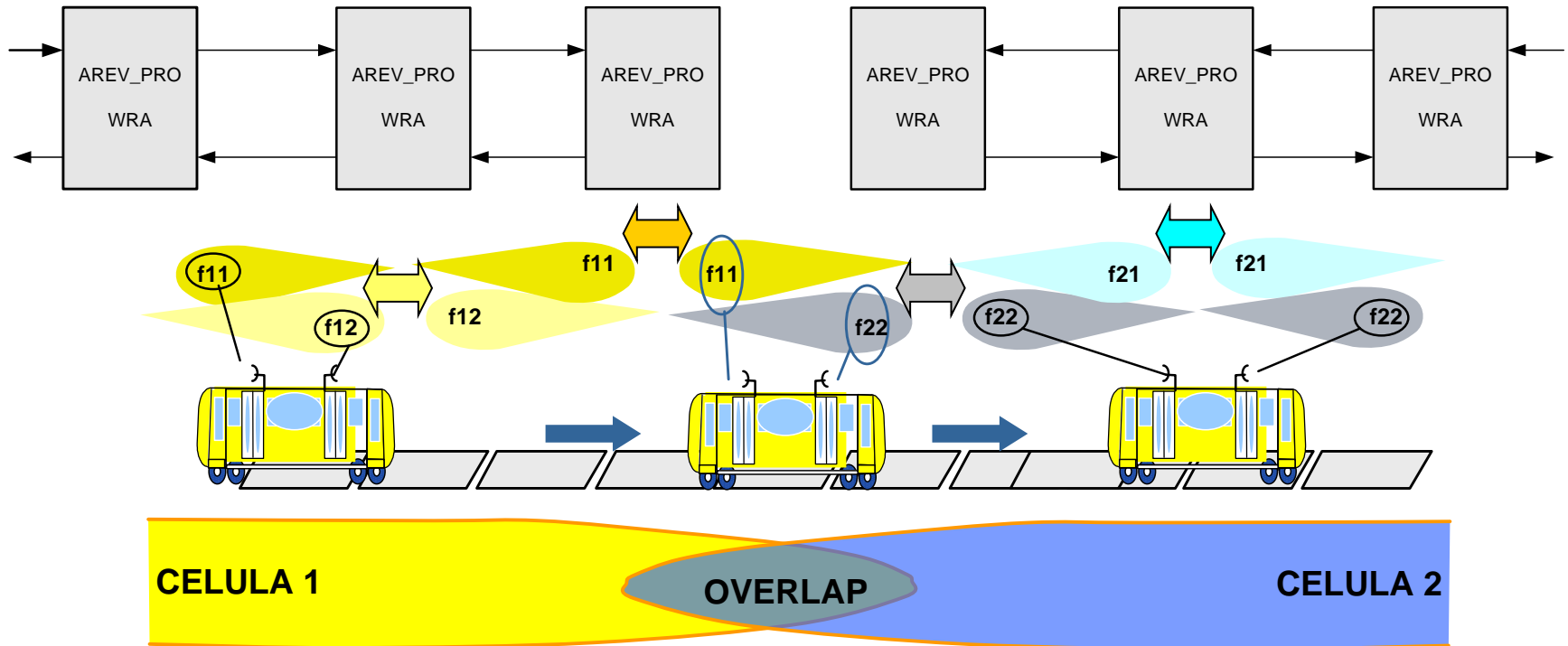
# Airlink

## Transmissão de WTU para WRU



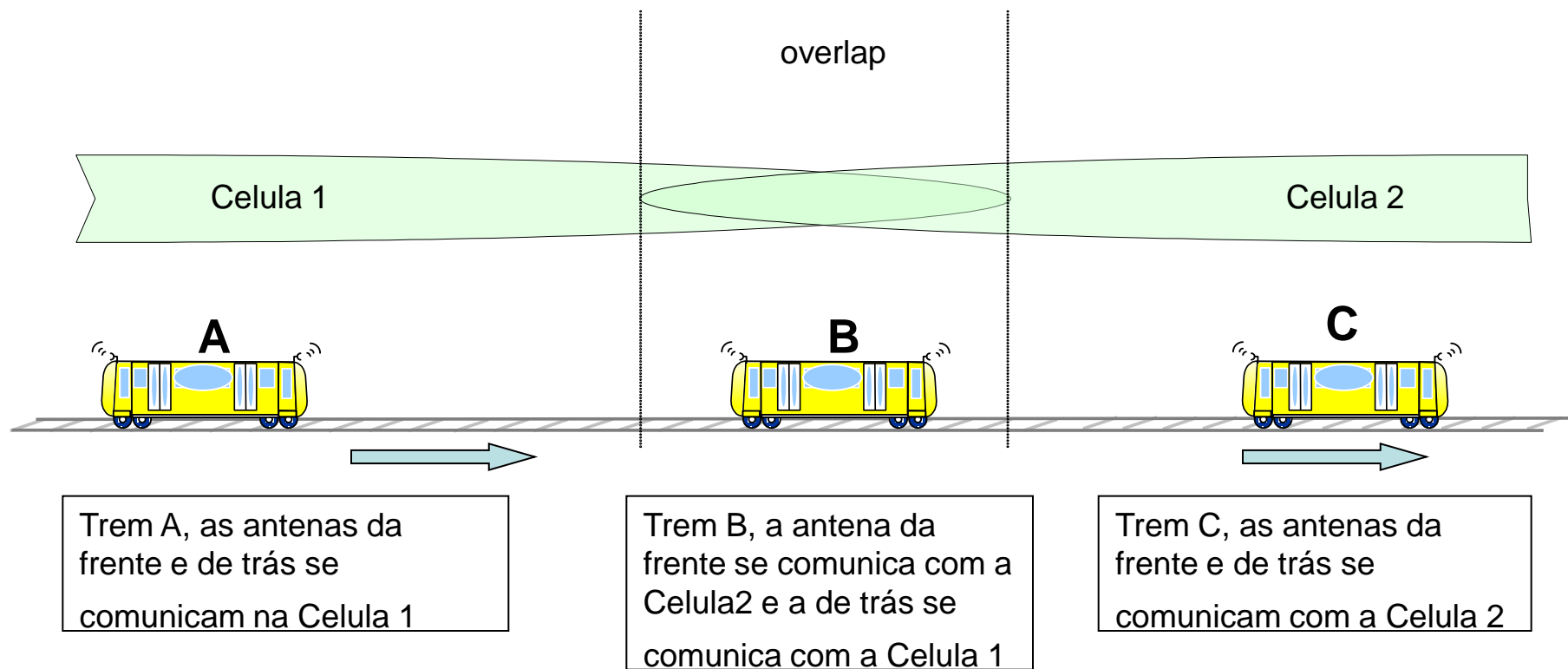
# Airlink

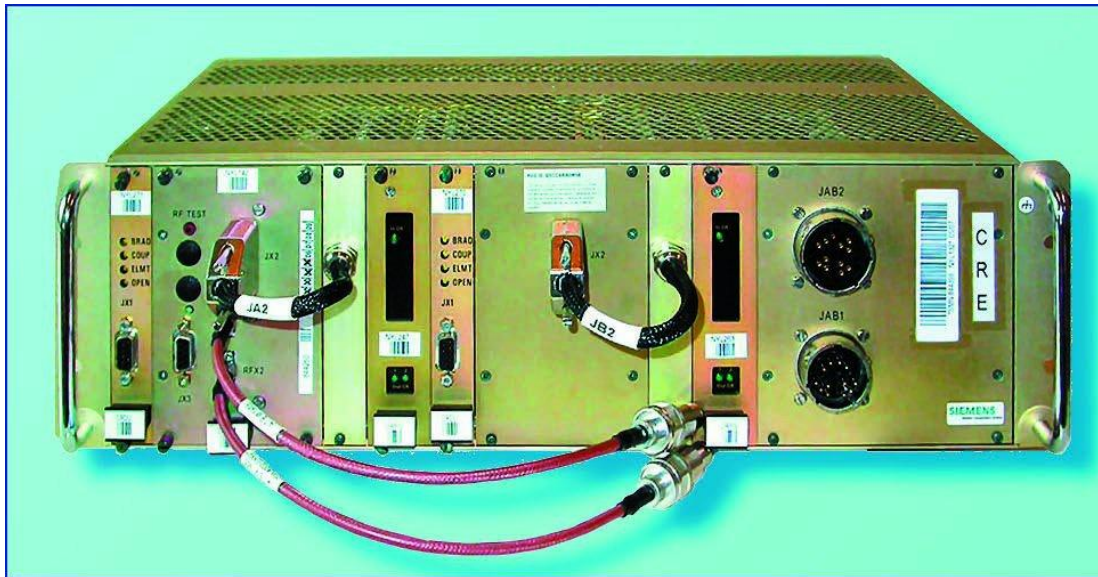
## Divisão em Celulas



# Airlink

## Transição de uma célula a outra





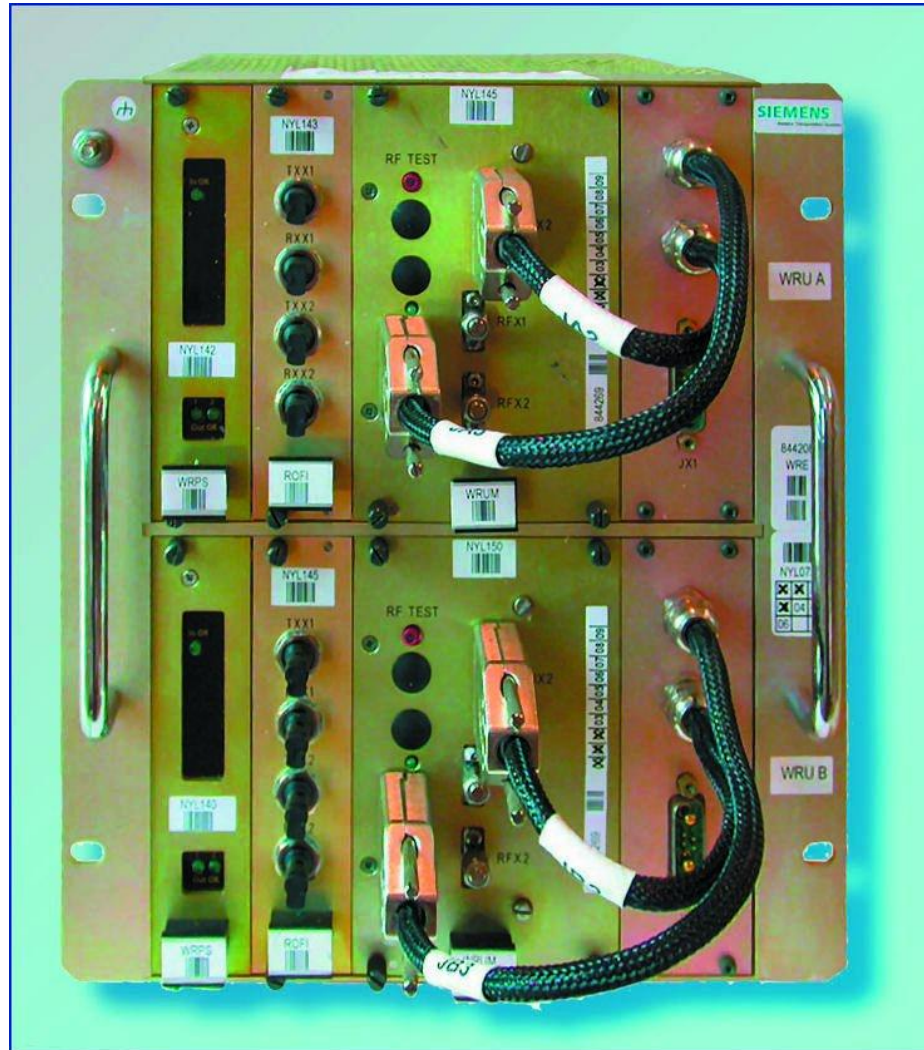
Carborn Radio Equipment



Várias tipos de antenas



# AIRLINK WRE – Wayside Radio Equipment



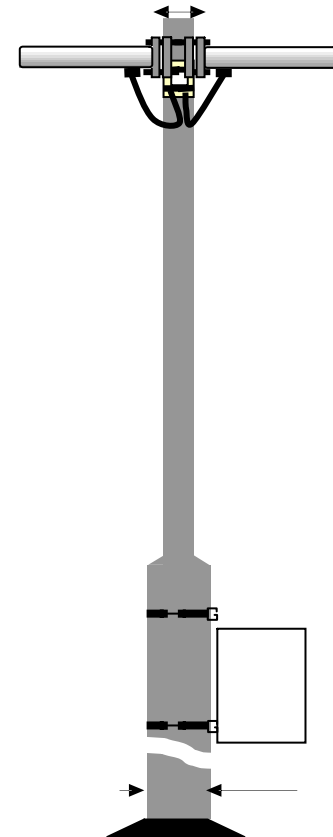
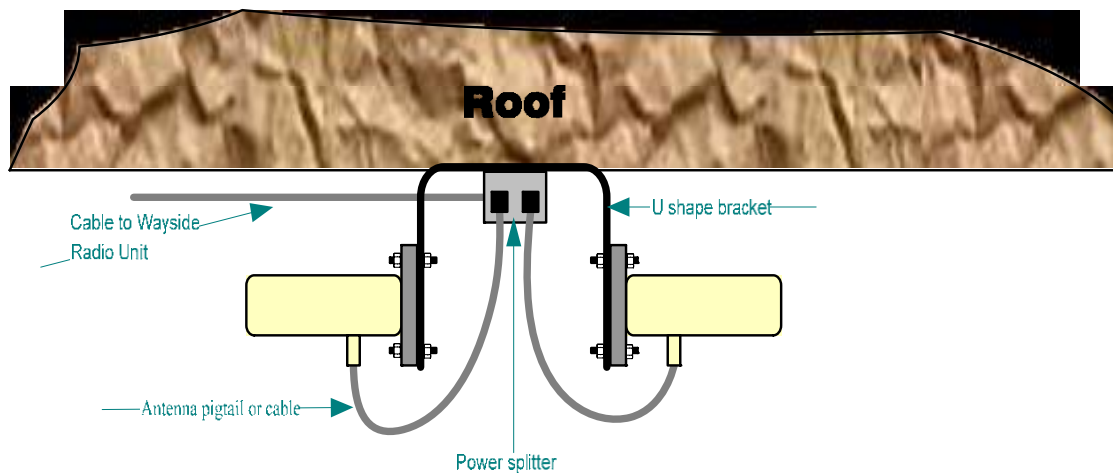


# AIRLINK

## CRA (Carborne Radio Antenna )



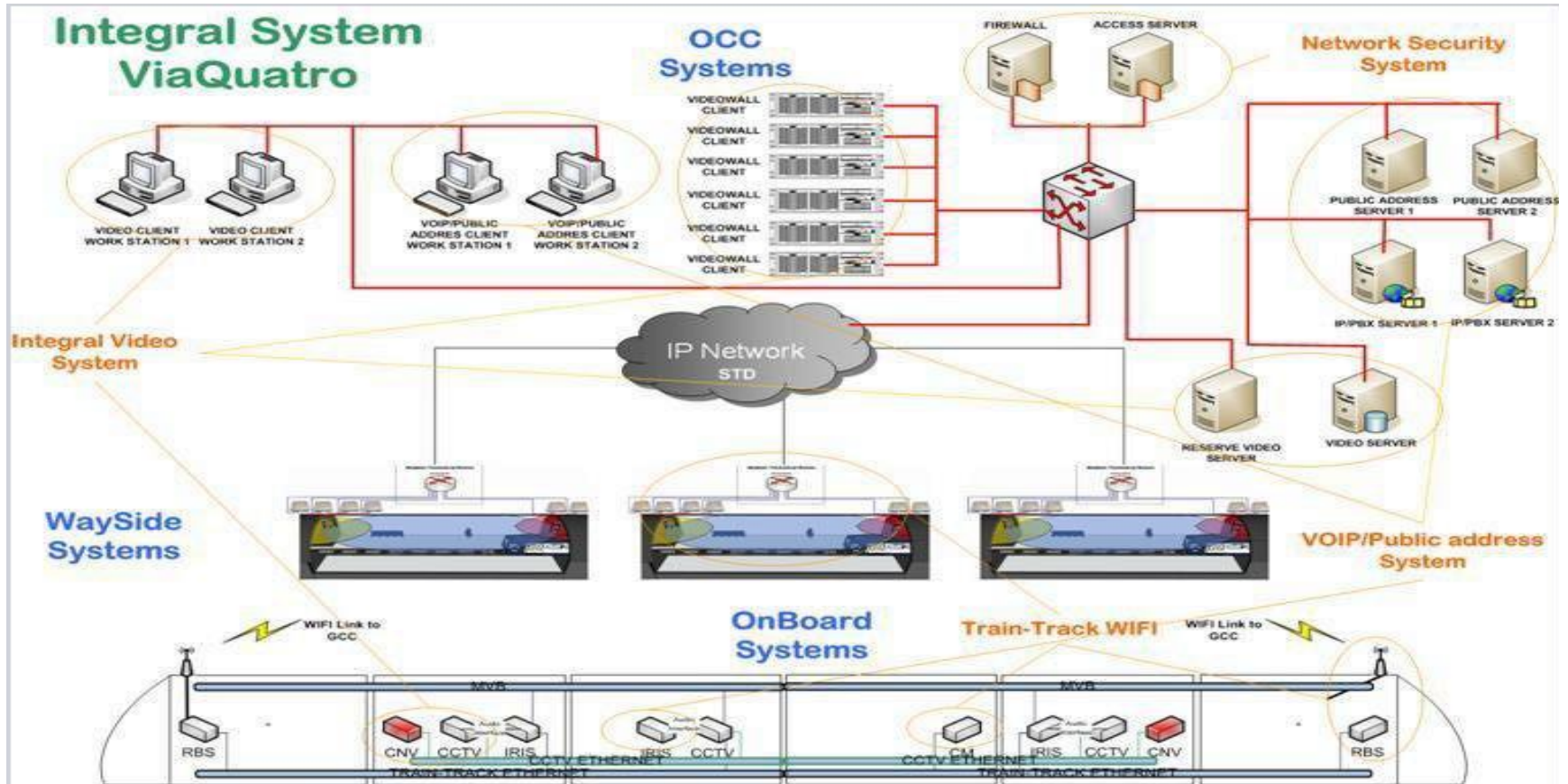
- **WRA = Wayside Radio Antenna**



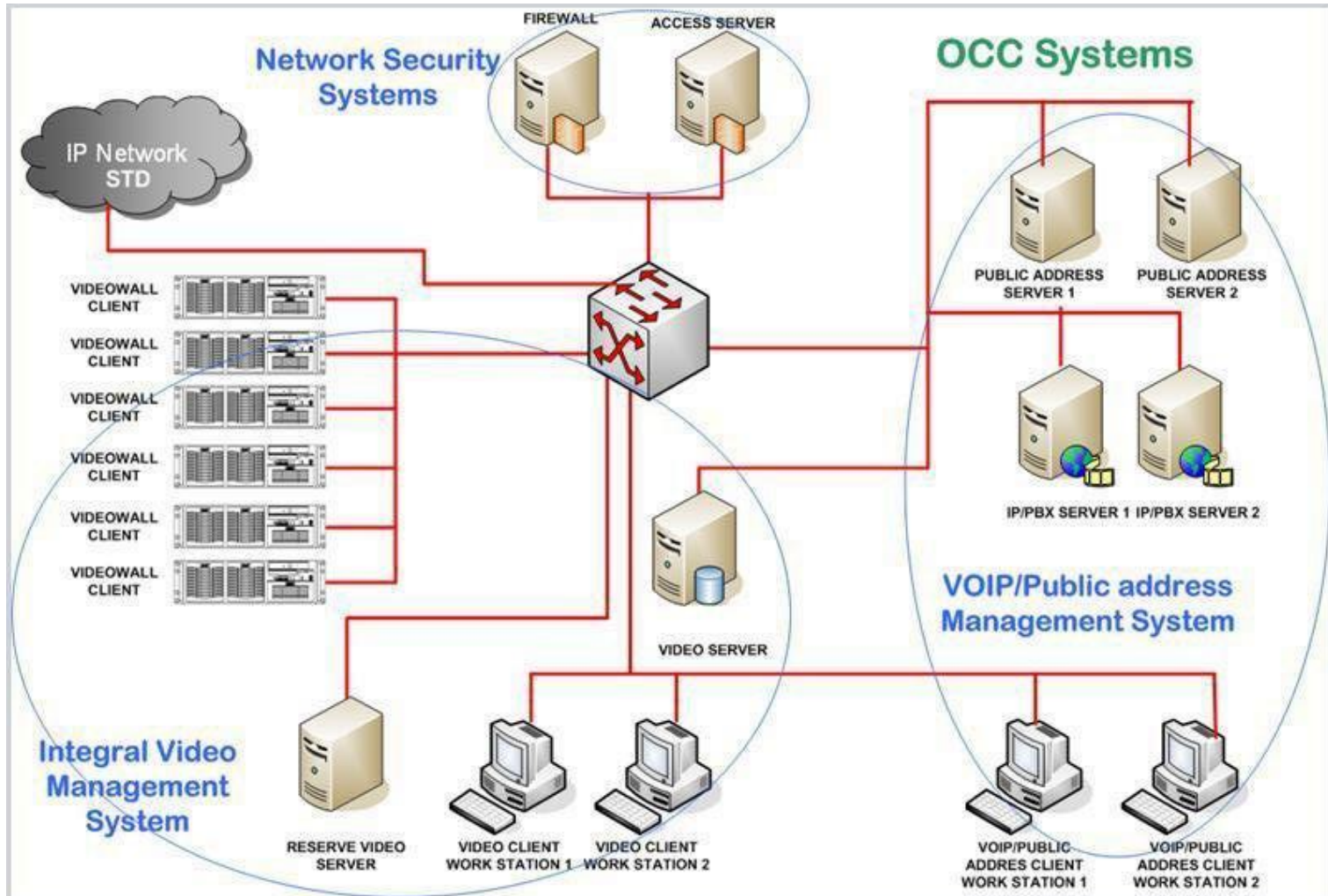
# AIRLINK

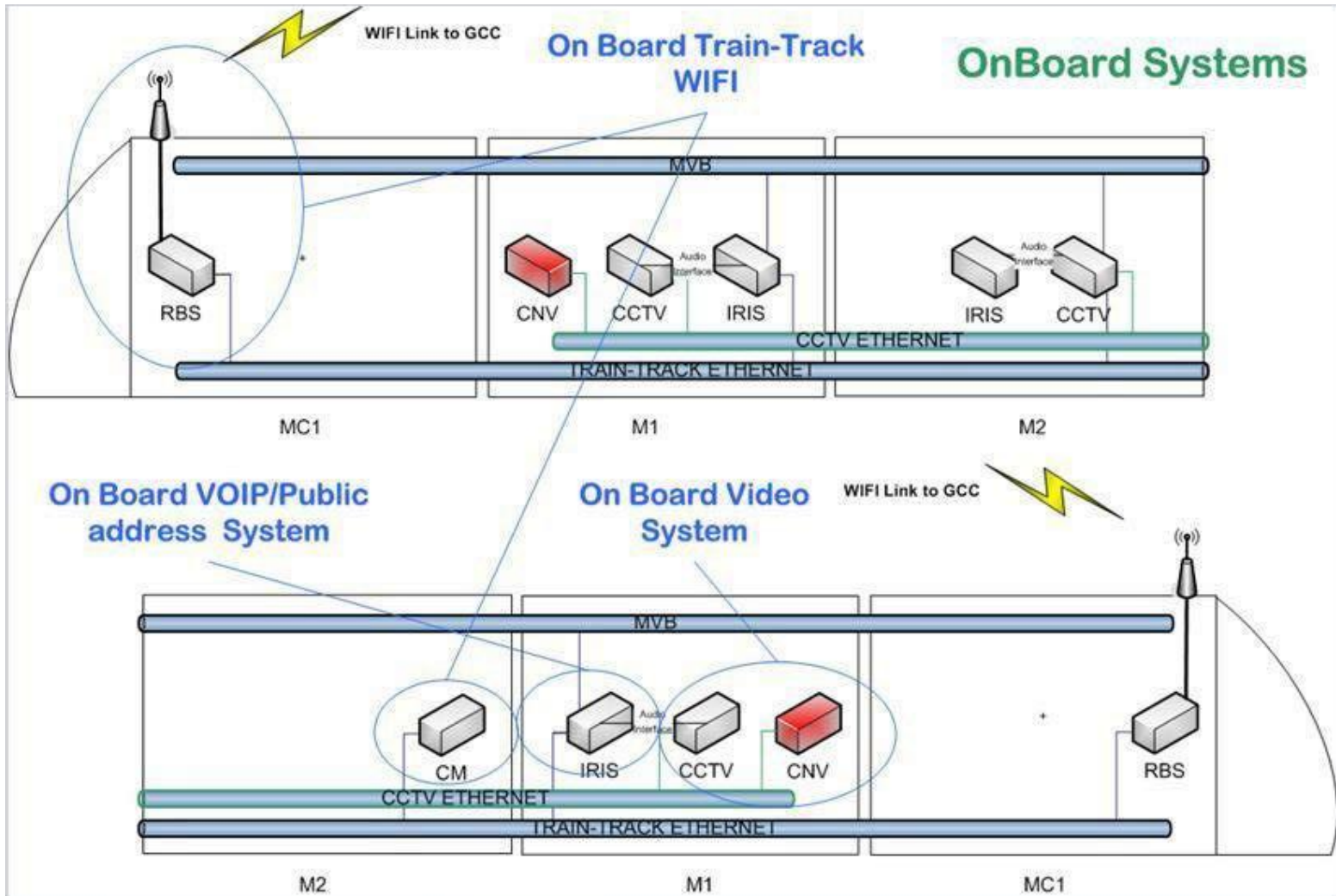
## Antenas Externas



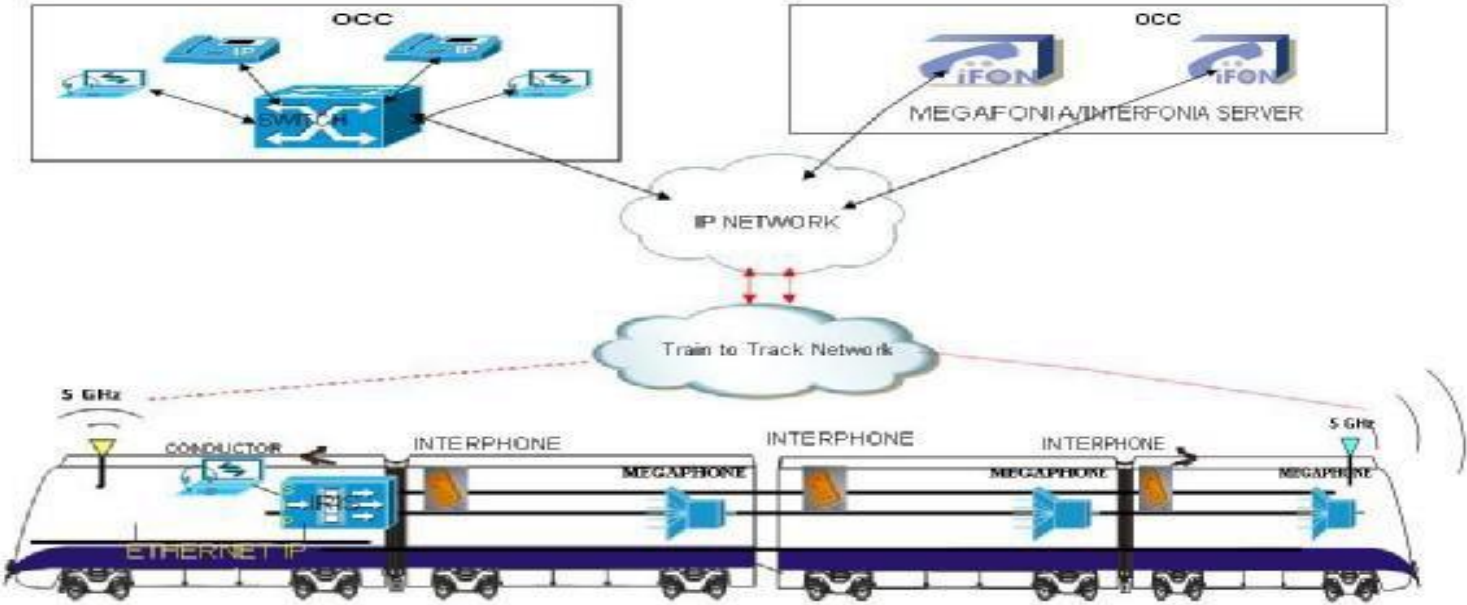








**TOPOLOGIES OF THE SOLUTION**



- Passenger Information System **(IRIS-SIVQ)**
- Video Surveillance System **(CCTV-SIVQ)**
- Train-Track On Board Communication System **(SCETT-SIVQ)**
- Video Advertisement System **(Optional)**



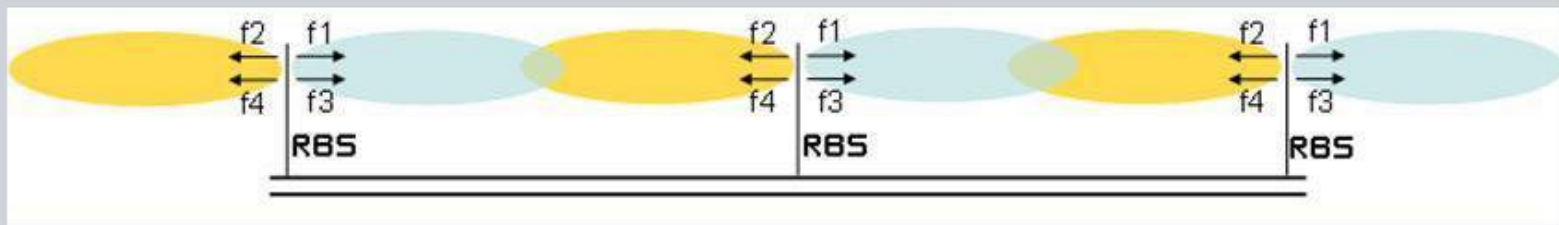


## Wayside Radio Equipment



## Radio Train to Track Wireless Network.

- Provides a full radio coverage area along the full path of the rail.
  - Tunnel.
  - Platforms.
  - Garage / Depot
- Redundant radio architecture.
- Overlapping and radio channels aggregation
- 5Ghz frequency band.



# Visão crítica

- UTO vs. DTO;
- A importância dos sistemas de Telecom;
- O “man” da história:
  - Operação Vs. Vigilância;
  - Postura;
  - Estado letárgico vs. Alerta;
  - Deslocamento no interior dos trens.
- O sistema de detecção redundante:
  - Inutilidade em linhas carregadas;
  - Redução da confiabilidade;
  - Não adequação a linhas sobre laje.
- Oportunidades de melhoria:
  - PSDs em SIL4;
  - Controle individual de portas (trem e PSDs);
  - Integração de sistemas.